

Signif. level  
 $\alpha = 0.05 = 5\%$       0.01

p-value  
~~sample~~ less than  $\alpha = 0.05$   
reject  $H_0$  (claim)

$p\text{-val} < \alpha \Rightarrow \text{reject } H_0$

$H_0: \mu = 10$   ~~$H_0: \mu = 10$~~   
 $H_a: \mu > 10$

2 sentences

stats { ① We reject/fail to reject  $H_0$   
because our p-value is  
less than/greater than  $\alpha = \underline{\hspace{2cm}}$ .

english { ② We have sufficient evidence that  
the mean of                      is  $\begin{matrix} > \\ < \\ \neq \end{matrix}$   
# units. ↑  
write out

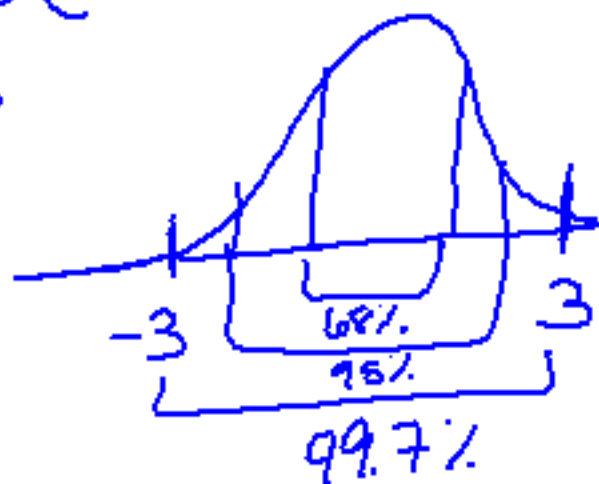
complete sentence  $H_0$ .

Ex:

$$\bar{x} = 86.2$$

$$90 \text{ mph} = \mu$$

$$\frac{2.2}{n=10} = \sigma$$



① Hypotheses:

$$H_0: \mu = 90$$

$$\rightarrow H_a: \mu < 90$$

②

$$Z = \frac{\bar{x} - \mu}{\sigma / \sqrt{n}} = \frac{86.2 - 90}{2.2 / \sqrt{10}} =$$

$$= -5.462 \sigma$$

③ P-value:

$$P(Z < -5.462)$$

$$\text{normcdf}(-\infty, -5.462, 0, 1)$$

$$= 2.36 \times 10^{-8}$$

④ We reject  $H_0$  b/c p-value  $< \alpha = 0.05$ .

We have sufficient evidence that the avg. pitch speed is less than 90 mph.

2 sided  $\rightarrow \neq$   
one sided:  $>, <$

$$\mu = 39.5$$

$$\alpha = 0.05$$

$$\bar{x} = 42$$

$$\sigma = 12$$

$$n = 900$$

① Hyp.

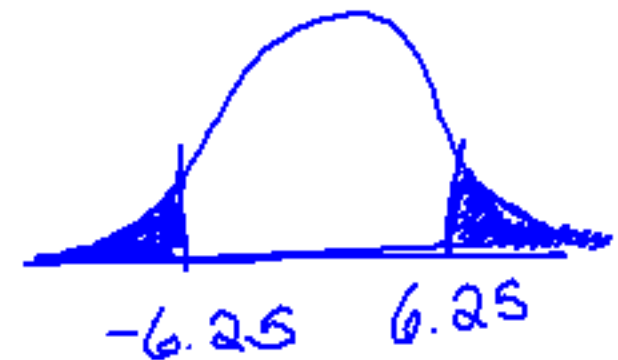
$$H_0: \mu = 39.5$$

$$H_a: \mu \neq 39.5$$

$\nearrow$   
2 sided

$$\textcircled{2} Z = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}} = 6.25$$

$$\textcircled{3} 2 \cdot P(Z > 6.25) =$$



$$2 \cdot \text{normcdf}(6.25, \infty, 0, 1) \\ = 4.12 \times 10^{-10} < 0.05 < 0.01$$

④ We reject  $H_0$  b/c  $p\text{-val} < \alpha = 0.05$ .

We have suff. evid. that

the mean voter age is not equal  
to 39.5 yrs. old.

p-value: 0.03

\*  $\alpha = 0.05$   $\Rightarrow$  reject

$\rightarrow$   $\alpha = 0.01$   $\Rightarrow$  fail to reject

$$\alpha = 0.10$$

$$\alpha = 0.005$$

fail to reject  $\neq$  accept

$$H_0: \mu = 10$$

STEP #1

# Assumptions

## STATE

① SRS

②  $\sigma$  known

③ normal pop.  
or  
 $n \geq 30$

## CHECK

① circled

②  $\sigma = 14.2$  / circled

③  $n = 64 \checkmark 30$

# AP Style work Assumptions

#5)  $H_0$ :  
 $H_a$ :

$$Z = \frac{\bar{x} - \mu}{\sigma / \sqrt{n}} = -2.592$$

$$P(Z < -2.592) = 0.00478$$

We reject ....